SUNNYSIDE

H_2O_2 – *Bridge Over Troubled Water*

March 22, 2016

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A good day to learn more about water…

UN WATER
WORLD WATER DAY

History

- 2002 – New Water Supply with Chlorine Gas
  - Unsatisfactory Chlorine residual…constant BWAs
- 2008 – Mixed oxidation system Pilot (Miox)
  - Two-year Pilot to improve residual and reduce DBPs
- 2010 – Water system extended 8kms + Igor!
  - High THMs and HAAs
- 2012 – Final extension of water system
- 2013 – *Extremely* high THMs and HAAs
- September 2015 - H_2O_2 Pilot
  - Positive results were almost instantaneous

Historically THMs & HAAs Exceeded Guidelines

- *…until we Bridged our Troubled Water*

Date	THMs 100 ppb = Guideline	HAAs 80 ppb = Guideline
Nov 2008	112	220
Nov 2009	144	170
Nov 2010	321	288
Nov 2011	333	264
Nov 2012	291	318
Aug 2013	305	333
June 2014	306	416
Aug 2015	306	301
Dec 2015	*45*	*39*

How Simple the System Works

How Sunnyside's H_2O_2 Works

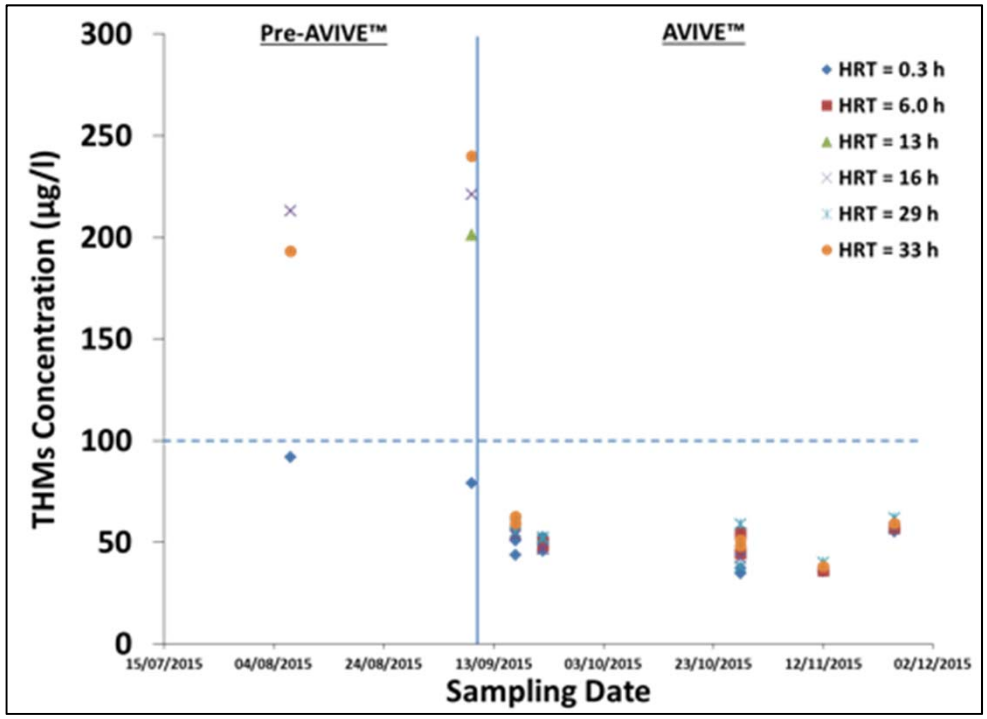
- Stabilized hydrogen peroxide – which combines food-grade hydrogen peroxide with minute and safe soluble silver ions (4-5 ppb) – and can hold and control a residual in distribution
- Automated dosing for better outcomes at lower concentrations of disinfectants

Objectives of the Pilot

- To achieve water quality within the Health Canada Guidelines for Drinking Water Quality
- Test and monitor water quality during the Pilot
- Maintain satisfactory disinfection capability at *all* points in the Sunnyside water distribution system

Pilot Results

- Lowered levels of DBPs by 72%; Town's drinking water is within Health Canada Guidelines
- Sampling shows DBPs to be within Guidelines at all points in the water distribution network



More Pilot Results

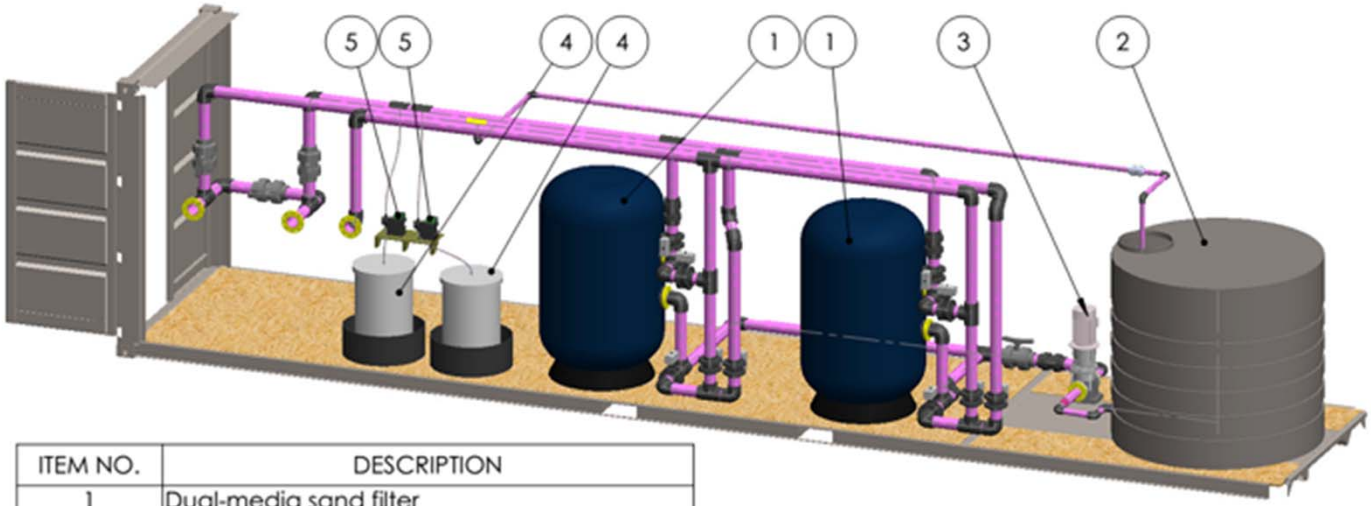
- *No chlorine taste and smell!*
- Responses from townspeople have been positive with comments on improved aesthetics, softer water, more gentle for washing and improvement of some skin conditions
- The Town has authorized the Project to proceed to the Optimization Stage and to add filtration to the system

Implications

- A vital public health and safety issue has been successfully addressed
- Waste less treated water; expecting to see operating costs come down
- Watershed and environmental impact have been improved
- Useful life of water infrastructure has been extended and a long -term funding need is reduced
- Integrity of the water distribution network is improved and less susceptible to boil water advisories
- Sunnyside has confidence in our water - *straight from the tap* - for drinking, washing and cooking

Optimization Phase

- A dual filter system including a multi-media filter of anthracite; two layers of sand; and gravel – using pre-built/stand-alone/plug-in WaterShed™



ITEM NO.	DESCRIPTION
1	Dual-media sand filter
2	Backwash water storage tank
3	Backwash circulation pump
4	Chemical storage tanks with spill containment (pH correction and flocculent)
5	Chemical dosing pumps (pH correction and flocculent)

Optimization Phase Objectives

- Remove Natural Organic Matter ("NOM”)
- Further lowering DBPs caused by reaction with chlorine primary disinfectant over time
- Whereas the water without filtration is already within Guidelines, we realize that Canada's Guidelines are lenient relative to the rest of the world and our goal is to exceed current regulations and anticipate future change and tougher standards

Optimization Benefits

- Remove excessive inorganics including dissolved iron and manganese in the water
  - Improved colour and taste of treated water
  - Less staining and discolouration of plumbing fixtures and laundry
  - Lower mass of deposits in distribution piping (possible contributor to mixed biofilms which may harbour pathogens as contamination sources)
- And thus render the Town less susceptible to future BWAs connected to the above-described water quality issues

Optimization Benefits

Implications

- Provide a basis for safe and high quality water storage, which the Town can expect to need in years to come
- Less costly vs. membrane filtration which runs 10-20 times the capital cost and more expensive to run/more things to go wrong
- More natural process and kinder to the environment
- Greater efficiency, resiliency, and greater adaptability when dealing with extreme weather occurrences

A ‘ripple’ effect…

Healthy water. Cleaner pipes and tanks. Lower cost. Better source protection. Elimination of disease-causing by-products. Effective recycling. Better reuse capabilities. Tastes great straight from the tap – so less bottled water. Reduced landfill. Cleaner air. Reduced energy costs.

The Town's Pilot Partner

SanEcoTec®

Healthy Water Can Change The World.

2015 Clean50

Outstanding Contributors to Clean Capitalism

TOP 15 PROJECT

PEOPLE'S CHOICE WINNER

AVIVE™

HEALTHY WATER. BETTER LIFE.

Frequently Asked Questions

- Capital cost
- Timing
- Operating cost
- Skilled maintenance requirements
- Spare parts
- Dangerous materials and handling